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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,920	05/19/2006	Ken Sawabe	SOEI0021	9014

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GRIFFIN & SZIPL, PC
SUITE PH-1
2300 NINTH STREET, SOUTH
ARLINGTON, VA 22204

EXAMINER

THOMPSON RUMMEL, PONDER N

ART UNIT	PAPER NUMBER
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1753

MAIL DATE	DELIVERY MODE
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07/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,920	Applicant(s) SAWABE ET AL.	
	Examiner Ponder N. Thompson-Rummel	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5/19/2006, 6/21/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

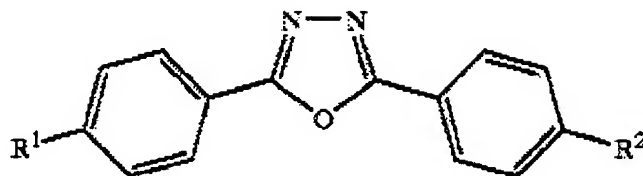
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4-6, 11, 13, 15, 16, 18, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Gries et al. (US 2003/0186165).

With respect to claims 1, 2, 4-6, 11, 13, 15, 16, 18, and 19 Gries et al. discloses a photopolymerizable composition that comprises:

- A. a binder that has a molecular weight between 600 and 200,000 an acid number is between 10 and 250 (paragraph [0063]) and is in the preferable amount of 20-80% by weight (paragraph [0063]);
- B. a polymerizing compound (paragraph [0064]);
- C. a photoinitiator such as a dimer of 2,4,5 –triaryl-imidazole (paragraph [0060]) of an amount between 0.5-20% by weight (paragraph [0060], page 5); and
- D. a compound (an optical brightening agent or sensitizing agent) of the following formulas



where $R^1=R^2 = \text{NEt}_2$ (paragraph [0036]) in amount of 0.1 to 10% by weight (paragraph[0012]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al (US 5,476,690) in view of Gries et al (US 2003/0186165).

With respect to claims 1-6,10-19 Ohta et al. discloses a process for preparing a printed circuit board that comprises a light-sensitive resin composition that comprises:

A. a high molecular weight binder having an acid value of 10 to 46 mg KOH/g (column 4, lines 5-10), a molecular weight between 20,000 and 2000,000 column 5, lines 41-46 and Synthetic Example 4 – column 10, lines 15-21) and in amounts of 40 to 80 parts per weight (column 6, lines 24-26) ;

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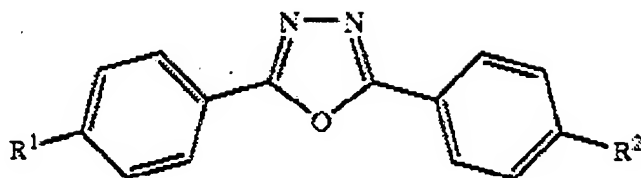
- B. a compound having a least two polymerizable unsaturated double bond, such as bisphenol A (column 5, lines 55-59), in amounts of 20 to 60 parts by weight (column 6, lines 26-30); and
- C. a photopolymerization initiator, such as a 2,4,5-triarylimidazole dimer (column 6, lines 13-21), in amounts of 0.1 to 10 parts by weight with respect to content of A and B (column 6, lines 31-33).

Ohta et al. further discloses forming a layer of the light-sensitive resin composition of claim 1 onto a substrate (support) (column 6, lines 44-49).

However, Ohta et al. does not disclose the use of a compound of formula (1) or (2) of applicant's claim 1.

Gries et al. discloses a photosensitive resin that comprises:

- A. a binder that has a molecular weight between 600 and 200,000 and an acid number is between 10 and 250 (paragraph [0063]) and is in the preferable amount of 20-80% by weight (paragraph [0063]);
- B. a polymerizing compound
- C. a photoinitiator such as a dimer of 2,4,5-triaryl-imidazole (paragraph [0060]) of an amount between 0.5-20% by weight (paragraph [0060], page 5); and
- D. a compound (an optical brightening agent or sensitizing agent) of the following formula



where $R^1=R^2 = \text{NEt}_2$ (paragraph [0036]) in amount of 0.1 to 10% by weight (paragraph[0012]) that meets the limitations of formula (1) set forth by applicant's claim 1.

Sensitizing agents within prior art do not produce sufficient speed (sensitivity) to enable short exposure time with the available blue or violet lasers (paragraph [0006]) and therefore, more expensive xenon or high power lamps are used to expose the resist. The use of the optical brightening above enables to obtain a high-speed photopolymerizable composition.

It would have been obvious to one of ordinary skill within the art at the time of the invention to include an optical brightening agent as disclosed by Gries et al. within the light-sensitive resin composition of Ohta et al. to improve speed and shorten exposure time of the resist as well as to reduce cost in by using inexpensive light sources such as blue or violet lasers.

With respect to claims 6 and 16-19, Ohta et al. further discloses forming a layer of the light-sensitive resin composition of claim 1 onto a substrate (support) (column 6, lines 44-49).

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With respect to claim 7, Ohta et al discloses a method of forming a negative pattern comprising:

- A. laminating a light-sensitive element that consist of a layer of the light-sensitive resin composition onto the surface of the substrate (column 7, lines 1-3);
- B. imagewise irradiating the light sensitive composition with active light (column 7, lines 16-26); and
- C. developing the substrate (column 7, lines 55-57)

With respect to claim 8, Ohta et al further discloses a process for preparing a printed circuit board by electroless copper plating by using the negative pattern of the light-sensitive resin composition (column 8, lines 11-18) as formed in claim 7.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ponder N. Thompson-Rummel whose telephone number is 571-272-9816. The examiner can normally be reached on Monday-Friday 7:00 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ptr

f.t.p.

Cynthia Kelly

CYNTHIA M. KELLY
ELECTRONIC BUSINESS CENTER
EBC CENTER 1700